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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/17/2003

Masato Yokoyama

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EXAMINER

PHAM, HAI CHI

ART UNIT

PAPER NUMBER

2861

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/663,782	Applicant(s) YOKOYAMA, MASATO	
	Examiner Hai C. Pham	Art Unit 2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-8,11-15 and 17-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-8,11-15 and 17-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>03/08/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request For Continued Examination

1. The request filed on 03/08/06 for a Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 10/663,782 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.
3. Claims 2-4, 14, 18 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2:

- The following limitation recited at line 17 “a second adjustment unit provided to rotate said optical element about the second supporting unit in the direction of the second axis” [where the second axis is being defined as being parallel to the beam-incidence direction] appears to be misleading. Referring to Figs. 8A and 8B of the current Application, the end 69B of the optical element (or lens 69) is rotated in the direction of the sub-scanning direction or axis Q2 instead of in the direction of the beam incidence or axis Q3 while the other end 69A is maintained fixed. For the purpose of examination, the above-mentioned limitation will be

interpreted as followed --a second adjustment unit provided to rotate said optical element about the second supporting unit in the sub-scanning correspondence direction--.

Claim 14:

- Similarly, the limitation recited at line 17 “rotating said optical element about the second supporting unit in the direction of the second axis” is misleading (please see above discussion). For the purpose of examination, the above-mentioned limitation will be interpreted as followed --rotating said optical element about the second supporting unit in the sub-scanning correspondence direction--.
- Claim 18:
- The following limitation “the optical scanner comprises a CCD camera configured to record image data at a time based on output signals of the three photodetectors” (emphasis added) appears to be vague and is not fully understood. The examiner will assume that CCD cameras are being used as the three photodetectors for detecting the times of passage of the light beam and output signals based on which the scanning time is calculated to determine the main scanning speed.

Claim 22:

- The limitation recited at line 17 “second adjusting means for rotating said optical element about the second supporting unit in the direction of the second axis” is misleading (please see above discussion). Again, for the purpose of examination, the above-mentioned limitation will be interpreted as followed --second adjusting

means for rotating said optical element about the second supporting unit in the sub-scanning correspondence direction--.

Claims 3 and 4 are dependent from claim 2 above and are therefore indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (JP 11-153765) in view of Ozaki et al. (US 6,353,455) and Ueda (JP 2001-117033).

With regard to claim 13, Ito et al. discloses an optical scanner used in an image forming apparatus, which comprises a light source (1) a reflection mirror (5) and an optical element (optical correcting system 4) for adjusting a position of a scanning line in a sub-scanning direction (the optical correcting system 4 correcting an inclination of the scan line on the surface of the photoconductor drum with respect to the main scanning direction), a first adjustment unit (actuator 16, Fig. 7) provided to rotate the reflection mirror (5) around the second axis defined along the reflection surface and perpendicular to the main scanning direction (e.g., angle β) (Figs. 2-3) in order to correct the curvature of field in the main scanning direction (Fig. 4), and a second adjustment unit (adjusting

screw 24, Fig. 12) provided to rotate said optical element (4) around the fourth axis defined along the beam incidence direction and perpendicular to the main scanning direction (e.g., angle Υ) (Figs. 11-12) in order to correct an inclination of the scanning line in the sub-scanning direction.

With regard to claim 14, Ito et al. also teaches a first supporting unit (attachment section 13 and attachment screw 18, Fig. 7) is provided at a first end of said at least one reflection mirror in the main-scanning correspondence direction outside a scanning range of said at least one reflection mirror, and the first adjustment unit (attachment section 12 and adjusting screw 16) is provided at a second end of said at least one reflection mirror (5) in the main-scanning correspondence direction outside the scanning range of said at least one reflection mirror, and a second supporting unit (attachment section 19) (Fig. 10) is provided at a first end of the optical element (4) in the main-scanning correspondence direction, and the second adjustment unit (attachment section 20 and adjusting screw 24) is provided at a second end of the optical element in the main-scanning correspondence direction.

However, Ito et al. does not explicitly teaches the first adjustment unit to rotate the reflection mirror being used to obtain uniformity of the scanning speed of the optical scanner in the main scanning direction as detected based on a difference of detection times of the light beam detected by three photodetectors.

Ozaki et al. discloses an image formation apparatus comprising an optical scanner which irradiates a light beam to a scanned surface of an image support to form an electrostatic latent image on the image support surface (see Fig. 4), the optical

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scanner comprising a light source (laser diodes 11, 12) emitting a light beam, at least one reflection mirror (reflecting mirror 24) (Figs. 53A-53B) having a reflection surface, a first axis parallel to a main-scanning correspondence direction on the reflection surface, and a second axis along the reflection surface and perpendicular to the first axis (Figs. 53a-53b), an optical element (f- θ lens 23) adjusting a position of a scanning line in a sub-scanning correspondence direction, the optical element having a beam-incidence surface, a third axis parallel to the main-scanning correspondence direction on the beam-incidence surface, and a fourth axis perpendicular to the third axis and along a beam-incidence direction (e.g., optical axis O_{10}), a first adjustment unit (not shown) provided to rotate said at least one reflection mirror around the optical axis O_{10} in order to attain uniformity of a scanning speed of the optical scanner in the sub-scanning correspondence direction (the reflecting mirror 24 is rotated about the optical axis O_{10} for adjusting the scanning period or non-uniformity of the scanning speed or evaluations (g) and (i)) (Fig. 53A) (col. 41, lines 47-52), and a second adjustment unit (not shown) provided to rotate said optical element around the fourth axis in order to correct an inclination of the scanning line in the sub-scanning correspondence direction to a desired position of the scanning line (the f- θ lens 23 is rotated about the optical axis O_{10} in the direction of the sub-scanning direction for adjusting the scanning line tilt or evaluation item (h)) (col. 41, lines 37-42) (Fig. 53B), a detection unit (CCD cameras 32-34) (Fig. 5) detecting an error of the scanning speed of the optical scanner (col. 26, line 37-47), the detection unit detects the error of the scanning speed based on a difference

of detection times of the light beam detected by at least three photodetectors (three CCD cameras 32-34).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art that by rotating the reflection mirror in Ito et al. would result in eliminating the distortion or non-uniformity of the main scanning speed of the optical scanner in view of the teaching of Ozaki et al.

Ito et al. also fails to teach the reflection mirror being a half mirror.

Ueda, an acknowledged prior art, discloses an image forming apparatus including a reflecting mirror (29) in the form of a half mirror for directing the incident beam toward the surface to be scanned (1a) while reflecting a portion of the incident beam toward the CCD sensor (22) for controlling the scanning position in the sub-scanning direction at each image height on the surface to be scanned.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a half mirror as the reflecting mirror in the device of Ito et al. as taught by Ueda. The motivation for doing so would have been to guide a portion of the incident beam toward the light position sensor such that an adjustment in the scanning speed can be performed.

With regard to claims 18-19, Ito et al. fails to teach the photodetectors being CCD cameras, and the distances between the three photodetectors being stored in the memory.

Ozaki et al. teaches using CCD cameras (32-34) arranged at predetermined distances along the main scanning direction for detecting the passage of the light beam,

the measured distance being compared to the predetermined distances between the CCD cameras so as to correct the main scanning speed of the light beam (Fig. 19e).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Ito et al. by providing three CCD cameras as taught by Ozaki et al. to be disposed at predetermined distance for the purpose of determining the main scanning speed of the light beam.

With regard to claim 17, Ito et al. in view of Ozaki et al. and Ueda discloses the claimed invention except for the three photodetectors being arranged on a back surface of the half mirror. It would have been obvious to one having ordinary skill in the art at the time the invention was made to position the three photodetectors on the back surface of the half mirror, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

6. Claims 1-4, 6-8, 15, 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Ozaki et al., Ueda and Takahashi et al. (US 6,493,010)

Ito et al. in view of Ozaki et al., Ueda discloses all the basic limitations of the claimed invention (please see preceding paragraph for the rejection) except for the first or second adjustment unit being provided with an electrically driven actuator.

Takahashi et al. discloses an optical scanner comprising a reflecting mirror (20), which is rotated about the pivotal support (63) using a feed screw (61) driven by the motor (62) for adjusting the scanning angle.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the motor-driven screw into the device of Ito et al. as taught by Takahashi et al. The motivation for doing so would have been to provide a high precision deviation correcting mechanism.

Ito et al. further teaches:

- the first supporting unit (attachment section 13 and attachment screw 18, Fig. 7) is provided at a first end of said at least one reflection mirror in the main-scanning correspondence direction outside a scanning range of said at least one reflection mirror, and the first adjustment unit (attachment section 12 and adjusting screw 16) is provided at a second end of said at least one reflection mirror (5) in the main-scanning correspondence direction outside the scanning range of said at least one reflection mirror,
- the second supporting unit (attachment section 19) (Fig. 10) is provided at a first end of the optical element (4) in the main-scanning correspondence direction, and the second adjustment unit (attachment section 20 and adjusting screw 24) is provided at a second end of the optical element in the main-scanning correspondence direction,
- the first adjustment unit comprises a feed screw (adjusting screw 16) provided to move said at least one reflection mirror against an elastic actuation force of an elastic member (flat spring 14) that compresses said at least one reflection mirror toward the first adjustment unit (Fig. 7),

- the second adjustment unit comprises a feed screw (adjusting screw 24) provided to move the optical element against an elastic actuation force of an elastic member (flat spring 26) that compresses the optical element toward the second adjustment unit (Figs. 10 and 12).

7. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Ozaki et al., Ueda and Takahashi et al., as applied to claim 1 above, and further in view of Murayama et al. (U.S. 4,847,642).

Ito et al., as modified by Ozaki et al., Ueda and Takahashi et al., discloses all the basic limitations of the claimed invention except for the plurality of image supports each having the first and second adjustment units.

Murayama et al. discloses a 4-drum color printer, each comprises a scanning-line deviation adjustment unit constituted by a reflecting mirror whose position is adjusted by an electrically driven actuator, wherein the yellow color image forming station is used as a reference station.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a color image forming stations in the device of Ito et al. since Murayama et al. teaches this to be known in the art to provide a separate and independently controlled color stations so as to perform a color image.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



HAI PHAM
PRIMARY EXAMINER

July 18, 2006